August 4, 2015

Mr. Charles F. Bolden, Jr.
Administrator
National Aeronautics and Space Administration
Washington, DC 20546

Dear Administrator Bolden:

The NASA Advisory Council held its third public meeting of 2015 at the Jet Propulsion Laboratory in Pasadena, California, July 29-31, 2015.

As a result of our deliberations, and in accordance with our "two-tier" approach for transmitting recommendations and findings to the NASA leadership, the Council approved two Council recommendations and one Council finding for your consideration (enclosed). The Council also approved one Committee recommendation and seven Committee findings for consideration by the respective NASA Associate Administrators. Copies of the latter also are enclosed for your information and awareness.

If you have any questions or wish to discuss further, please contact me.

Sincerely,

Steven W. Squyres
Chair

Enclosures

NASA Advisory Council Recommendation

NASA Procedural Requirements (NPR) 7120.5E
Governance and the Role of Center Directors
2015-03-01 (Council-01)

Name of Committee: NASA Advisory Council

Chair of Committee: Dr. Steven Squyres

Date of Council Public Deliberation: July 31, 2015

Short Title of Recommendation: NASA Procedural Requirements (NPR) 7120.5E
                                             Governance and the Role of Center Directors

Recommendation: The Council recommends that NASA examine the current Agency governance approach with the objective of more clearly defining the role of NASA Center Directors.

Major Reasons for Proposing the Recommendation: NASA's traditional governance structure has changed several times in the last two decades, significantly altering the authority and accountability of the Center Directors. Traditionally, the Associate Administrators controlled major milestones in approved programs, and then delegated responsibility and accountability for executing those programs to the relevant Center Director. The current NASA governance structure, in contrast, sometimes results in complex and even conflicting roles and responsibilities, with unanticipated consequences.

After the Space Shuttle Columbia accident, the Columbia Accident Investigation Board (CAIB) made numerous safety culture recommendations directed specifically at the Shuttle Program. The CAIB recommended establishing a Technical Authority (TA) to provide safety input to the Shuttle Program Manager, and separating program and TA budgets in assessing safety matters. The NASA Administrator at that time decided to extend the CAIB recommendations and implement that governance model across the Agency. At that point, Center Director accountability for program success became less clear. Center Directors retained responsibility for institutional management, but program authority resided at NASA Headquarters with the Associate Administrator, who has direct project authority over the program/project managers at the NASA Centers. This is despite the fact that NPR 7120.5E clearly states: *"Center Directors are responsible and accountable for all activities assigned to their Center. They are responsible for the institutional activities and for ensuring the proper planning for and assuring the proper execution of programs and projects assigned to the Center."* As a consequence, project formulation/execution authority and accountability was separated from Center oversight and leadership. This change also divorced program execution from the institutional capability to formulate and execute projects (e.g., engineering, quality assurance, project control, etc.). The implementation of the CAIB recommendation, intended to enhance safety for the Shuttle Program, when applied across the Agency contributed to lapses in the formulation and execution of some robotic science missions, e.g., the James Webb Space Telescope.

Consequences of No Action on the Proposed Recommendation: Confusion over the roles and responsibilities of Center Directors could lead to delays and/or cost overruns in important flight projects.

NASA Advisory Council Recommendation

National Research Council (NRC) Pathways to Exploration Report
2015-03-02 (Council-02)

Name of Committee: NASA Advisory Council

Chair of Committee: Dr. Steven Squyres

Date of Council Public Deliberation: July 31 2015

Short Title of Recommendation: National Research Council (NRC) Pathways to
                                                                       Exploration Report

Recommendation: The Council recommends that NASA provide a written response, in the form of a letter for the record, to the NRC Pathways to Exploration Report. This response should address the specific findings and recommendations of the report, identify which recommendations are accepted, and provide a brief rationale for choosing strategies that were different.

Major Reasons for Proposing the Recommendation: The Council found the joint discussion on the NRC Pathways to Exploration Report and the current NASA Human Exploration Strategy extremely valuable in codifying areas of agreement in approach and areas where there are technical differences in approach or risk assessment. The NRC report is a comprehensive and independent assessment that has stimulated good technical review and debate. A written response will provide an opportunity to document decisions to pursue alternate paths, some of which were based upon analyses and decisions that have taken place since the completion of the report (e.g., the decision to maintain the International Space Station through 2024).

Consequences of No Action on the Proposed Recommendation: There will likely be future externally directed studies of NASA's exploration strategy, and NASA will be asked to explain what they did in response to the NRC study and why they chose not to accept some of the recommendations that were made.

NASA Advisory Council Finding

Space Technology Funding for Humans to Mars

Name of Committee: Technology, Innovation and Engineering Committee /
                                                      Human Exploration and Operations Committee
                                                      (joint finding)

Chair of Committee: Dr. William Ballhaus / Mr. Kenneth Bowersox

Date of Council Public Deliberation: July 31, 2015

Short Title of Finding: Space Technology Funding for Humans to Mars

Finding: The Technology, Innovation and Engineering Committee and Human Exploration and Operations Committee have common exploration, technology, and operational needs and goals. The two communities are working together on topics of common interest, and this collaboration can serve to optimize future mission success.

A well-defined plan for the implementation of the U.S. objective of humans to the surface of Mars is mandatory to adequately assess funding for timely development of the required technology. When the NASA Space Technology Mission Directorate (STMD) was established, a plan was formulated that included well-defined deliverables and the necessary budget to execute the program (Strategic Space Technology Investment Plan, 2012). However, the Council finds that STMD has consistently lacked sufficient discretionary resources to deliver all the technology developments required across the Technology Readiness Level (TRL) spectrum to meet NASA's critical future mission goals.

NASA Advisory Council – Committee Recommendation

**Institutional Committee Recommendation
to NASA Associate Administrator for
Mission Support Directorate**

**Performance Plans Tied to Business Services Assessment (BSA)
IT Deep Dive Implementation**

Name of Committee: Institutional Committee

Chair of Committee: Ms. Kathryn Schmoll

Date of Council Public Deliberation: July 29, 2015

Short Title of Recommendation: Performance Plans Tied to Business Services
                                                                        Assessment (BSA) IT Deep Dive Implementation

Recommendation: The Institutional Committee recommends that NASA ensure that performance plans and appraisals for individuals that are assigned IT roles and responsibilities include specific goals and objectives related to the IT Pilot deep dive implementation.

Major Reasons for Proposing the Recommendation: Key responsible individuals should be held accountable for the implementation of the Agency decisions and actions resulting from the Business Services Assessment (BSA) IT deep dive. This is vital for the successful implementation and accountability of these decisions.

Consequences of No Action on the Proposed Recommendation: If this recommendation is not accepted there could be a lack of performance accountability to implement these Agency IT decisions.

NASA Advisory Council – Committee Finding

**Institutional Committee Finding
to NASA Associate Administrator for
Mission Support Directorate**

Business Services Assessment (BSA) IT Deep Dive Pilot

Name of Committee:	Institutional Committee
Chair of Committee:	Ms. Kathryn Schmoll
Date of Council Public Deliberation:	July 29, 2015
Short Title of Finding:	Business Services Assessment (BSA) IT Deep Dive Pilot

Finding: In the Institutional Committee's review of the NASA Mission Support Council (MSC) Business Services Assessment (BSA) IT Pilot Decision Package, the Committee saw that these decisions were grounded on a thoughtful process based on seven sensible guidelines, led by widely-trusted NASA leaders and conducted with extensive, active participation of Subject Matter Experts (SME's) and key stakeholders at the Centers as well as Headquarters. The Committee commends NASA management for initiating the review and for carrying it out in a professional, balanced, and inclusive manner.

- **IT Security:** Worthy of note is the decision to implement an independently led, zero-based review of IT security spending. In the past, new security tools have been implemented without validation that the older tools and manpower investments are still required, given the newer capabilities. Improvements in protection, detection, and reaction are all needed. NASA is showing noteworthy leadership in taking on that task.

- **Data Centers:** The Committee believes that NASA's implementation of a federated/hybrid data center operational model, as a step toward consolidating NASA data centers, has the potential for cost saving as well as increased security.

- **IT Governance:** The proposed governance model may give the NASA Chief Information Officer (CIO) insight into most NASA IT assets and spending and thereby enable improved management of NASA's IT investment.

- **Enterprise Architecture:** The Committee would like to stress the importance of completing the IT area portfolio enterprise architectures and framework as a near term priority to facilitate the effective implementation of the full set of Mission Support Council decisions.

NASA Advisory Council – Committee Finding

Institutional Committee Finding
to NASA Associate Administrator for
Mission Support Directorate

Business Services Assessment (BSA)

Name of Committee: Institutional Committee

Chair of Committee: Ms. Kathryn Schmoll

Date of Council Public Deliberation: July 29, 2015

Short Title of Finding: Business Services Assessment (BSA)

Finding: The Institutional Committee encourages the Agency to go forward with the Business Services Assessment (BSA) process. The Agency should continue to focus on the communication aspect of the BSA rollout and decision process with their employees. BSA should address the NASA Office of Inspector General (OIG) Top Management Challenges and other external audits concerns in their deep dive assessments. The Committee encourages multi-center participants and in the BSA functional reviews. The Committee would like to continue to be apprised of the Agency decisions/recommendations on the BSA Deep Dives when appropriate.

NASA Advisory Council – Committee Finding

**Human Exploration and Operations Committee Finding
to NASA Associate Administrator for
Human Exploration and Operations Mission Directorate**

Communications Strategy for Exploration Plans

Name of Committee: Human Exploration and Operations Committee

Chair of Committee: Mr. Kenneth Bowersox

Date of Council Public Deliberation: July 30, 2015

Short Title of Finding: Communications Strategy for Exploration Plans

Finding: The Human Exploration and Operations Committee noted a positive improvement in NASA's effort to communicate plans for Pioneering Space, including the Journey to Mars. Because of the critical importance of public engagement in the human exploration program, the Committee plans to request future briefings on this topic to monitor progress. During briefings on this topic, the Committee members thought that the following aspects of the communication approach were especially important:

1. The existence of a formal strategy to guide communication efforts
2. Engagement of the public using the latest communication methods including social networking
3. Engagement of the public in new forums
4. Collection of data to evaluate the effectiveness of communication efforts

NASA Advisory Council – Committee Finding

**Human Exploration and Operations Committee Finding
to NASA Associate Administrator for
Human Exploration and Operations Mission Directorate**

Outside Participation in Exploration Mission Planning

Name of Committee: Human Exploration and Operations Committee

Chair of Committee: Mr. Kenneth Bowersox

Date of Council Public Deliberation: July 30, 2015

Short Title of Finding: Outside Participation in Exploration Mission Planning

Finding: The NASA Human Exploration and Operations Mission Directorate (HEOMD) is leading an effort to build the technical rationale for a sustainable human exploration effort which will allow humans to pioneer space called the Evolvable Mars Campaign. Inclusion of groups outside the core NASA team in the Evolvable Mars Campaign study process helps to build support for the study results, and also allows for a wider set of creative approaches from which to build the final plans for human exploration. The Human Exploration and Operations Committee endorses the HEOMD's current effort to include outside participation in NASA's planning efforts for the Journey to Mars.

NASA Advisory Council – Committee Finding

Aeronautics Committee Finding
to NASA Associate Administrator for
Aeronautics Research Mission Directorate

Domestic and International Partnerships in Aeronautics

Name of Committee:	Aeronautics Committee
Chair of Committee:	Mr. John Borghese, Vice Chair *(for Ms. Marion Blakey, Chair)*
Date of Council Public Deliberation:	July 30, 2015
Short Title of Finding:	Domestic and International Partnerships in Aeronautics

Finding: The Aeronautics Committee recognizes the importance of partnerships for collaboration in aeronautics research and for the transference of technology. The Committee encourages the NASA Aeronautics Research Mission Directorate (ARMD) to continue with their domestic partnerships and with international partnerships where it makes sense, such as in research areas like air traffic management. It is not clear to the Committee how partnerships are selected and vetted to ensure who will provide the best partnerships, in particular international partnerships. International partnerships are important to ensure a consistent global approach to such areas as air traffic management. However, the Committee agrees that ARMD would be better served if it were clearer about whether the partnership is for "best in class" or if it is to understand where the world is with respect to specific technologies and regulatory areas that need to be harmonized globally.

NASA Advisory Council – Committee Finding

Aeronautics Committee Finding
to NASA Associate Administrator for
Aeronautics Research Mission Directorate

Air Traffic Management Project

Name of Committee: Aeronautics Committee

Chair of Committee: Mr. John Borghese, Vice Chair
                                           (for Ms. Marion Blakey, Chair)

Date of Council Public Deliberation: July 30, 2015

Short Title of Finding: Air Traffic Management Project

Finding: The Aeronautics Committee applauds the NASA Aeronautics Research Mission Directorate (ARMD) for establishing the Shadow Mode Assessment using Realistic Technologies – National Airspace System for Safe Trajectory Based Operations project that addresses reducing delays and increasing throughput in relation to air traffic management, and appreciates the project providing the Committee with enough detail to assess the project goals and approach. The Committee endorses the approach laid out by the project and feels that it provides tremendous benefit to the air traffic management community. The Committee would like to encourage the project to review its top risks and address these risks as part of its further development of the project technical areas. The Committee further encourages the project to carefully assess the impact of the risks if it is determined that these risks remain red, and how the project might change its scope to ensure positive benefit is achieved despite the risks.

NASA Advisory Council – Committee Finding

**Aeronautics Committee Finding
to NASA Associate Administrator for
Aeronautics Research Mission Directorate**

Encouraging University Leadership in Core Technical Challenges

Name of Committee: Aeronautics Committee

Chair of Committee: Mr. John Borghese, Vice Chair
                                                        (for Ms. Marion Blakey, Chair)

Date of Council Public Deliberation: July 30, 2015

Short Title of Finding: Encouraging University Leadership in Core Technical
                                                        Challenges

Finding: The Aeronautics Committee applauds the NASA Aeronautics Research Mission
Directorate (ARMD) for developing a strategy to encourage universities to move into a position of
leadership to tackle core technical challenges. The Committee suggests that ARMD use a Broad
Area Assessment (BAA) white paper approach in addition to its use of the Request For Information
(RFI) and NASA Research Announcement (NRA) solicitation process. The Committee feels that the
BAA would provide an opportunity for ARMD to give greater technical guidance for a given thrust
area.